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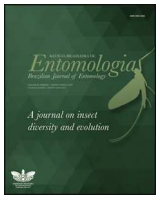
DOI: https://doi.org/10.1590/1806-9665-rbent-2020-0024

Revista Brasileira de Entomologia 64(3):e20200024, 2020

SOCIEDADE BRASILEIRA DE ENTOMOLOGIA
FUNDADA EM 1937

REVISTA BRASILEIRA DE
Entomologia
A Journal on Insect Diversity and Evolution



On the identities of Neotropical *Stegana* species (Diptera, Drosophilidae). I. Redescription of *Stegana magnifica* Hendel, 1913 and *Stegana fumipennis* (Enderlein, 1922)

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ARTICLE INFO

Article history:
Received 25 March 2020
Accepted 20 July 2020
Available online 7 September 2020
Associate Editor: Andrzej Grzywacz

Keywords
Brazil
Habitus
Peru
Photomicrographs
Terminalia

ABSTRACT

Two conspicuous Steganinae species, *Stegana* (*Steganina*) *magnifica* Hendel, 1913 from Amazonian Peru and *Stegana* (*Ceratostylus*) *fumipennis* (Enderlein, 1922) from southern Brazil, are redescribed based on holotypes, and their identities are clarified. Both species are exclusive to the Neotropical Region and the first, with a body length of about 5.5 mm, is the largest species of *Stegana* described so far in this region, while the latter displays a peculiar antenna bearing an unusual, forward-projected, comma-shaped flagellomere 1. The photomicrographs of the habitus and terminalia of each specimen are also provided.

Introduction

The genus *Stegana* Meigen, 1830 is easily recognized, and included species share several general and distinct characteristics (Bächli et al., 2004). However, external morphological features are highly variable with species overlapping and with determination of many species based on females remaining doubtful. Accurate identification normally depends on characters of the male terminalia. Thus, there is currently a lack of information about most of the 39 known species of *Stegana* described from the New World (Bächli, 2019; Pirani and Grimaldi, 2019). Consequently, we suspect that the identifications of numerous species in various collections are questionable.

Worldwide, there are presently five accepted subgenera within the genus *Stegana* and all but one of them (*Oxyphortica* Duda, 1923) have been recorded from the New World. The status and relationships of these subgenera remain open for interpretation (Pirani and Grimaldi, 2019, p. 453). While we treat for the moment the species we intend to study within their current subgeneric classification, we are convinced that the subgeneric division of *Stegana* needs revision and better characterization.

Chronologically, *Stegana coleoptrata* (Scopoli, 1763) and *Stegana furta* (Linnaeus, 1767) are the oldest *Stegana* species recorded in North America. Both of these described species were from Europe and their identities were questioned for a long time, even in Europe, and the latter has also been mentioned under the name *Stegana curvipennis* (Fallén, 1823). Since some authors have treated these two species as synonyms, it is almost certain that the older records of *Stegana coleoptrata* (Scopoli, 1763) and *Stegana furta* (Linnaeus, 1767) are inaccurate. *S. furta* has already been removed as a New World species.

Later, a third species, *Stegana pallipes* Wiedemann, 1830, was described from Brazil and again, the identity of this species is questioned because the type material is apparently lost and the short description does not unequivocally distinguish it from congeners. Towards the end of the 19th Century, two more species were described from the Caribbean Islands of Saint Vincent and the Grenadines by Williston (1896): *Stegana horae* and *Stegana tarsalis*. Shortly afterwards, *Stegana vittata* (Coquillett, 1901) was described from the United States, which

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https://doi.org/10.1590/1806-9665-RBENT-2020-0024

was referenced by Sturtevant (1921) as the species with straight wings, since the "standard" *Stegana* species have wings that bend downwards. Sturtevant treated *S. vittata* as a synonym of *S. coleoptrata* because he was unable to separate specimens of these species. Additional species were then described by Hendel (1913), Enderlein (1922), Malloch (1924a, 1924b), Duda (1925, 1927) and Curran (1934). Although some of these species were sometimes assigned to different genera, this view was not always accepted by later authors.

Among the papers cited above, the largest contribution to the knowledge of New World *Stegana* species comes from Malloch (1924a, 1924b) who reported, described or redescribed 20 species, mostly collected by Pablo Schild in Costa Rica (collection currently in the USNM). Of these 20 species, 16 were new to science. Malloch also included four previously described species *S. acutangula* (Hendel, 1913), *S. magnifica* Hendel, 1913, *S. curvipennis* (Fallén, 1823) and *S. tarsalis* Williston, 1896. Malloch also compared *S. horae* Williston, 1896 with his *S. tempifera*.

The six Nearctic species of *Stegana* were previously revised in detail (Laštovka & Máca, 1982); however, of the 33 Neotropical congeners only *Stegana penicillata* (Kertész, 1901), has recently been redescribed (Pirani and Grimaldi, 2019; Bächli and Vilela, 2020b). Moreover, based on their original descriptions and/or limited available keys, it has been virtually impossible to identify the remaining species.

To partially address these problems, we have analyzed, redescribed, photomicrographed, and dissected the holotypes of two conspicuous species, *Stegana fumipennis* (Enderlein, 1922) from Southern Brazil (state of Santa Catarina) and *Stegana magnifica* Hendel, 1913 from Amazonian Peru (probably near the border between the Cusco and Ucayali Regions).

This is the first of a series of papers that are intended to clarify the identities of Neotropical species of *Stegana*. In this study we describe a cost-effective method for producing high-quality photomicrographs of the habitus and male terminalia, which are essential to identify these species.

Material and methods

The redescriptions are based on two holotypes: a male of *Stegana magnifica*, collected on 12.X.1902 by C. Schnuse and O. Garlepp from Amazonian Peru and described by Hendel (1913); and a female of *Stegana fumipennis*, collected in southern Brazil by H. Fruhstorfer and described by Enderlein (1922). The specimens were loaned to us from the Senckenberg Collection, Dresden, Germany (formerly known as the Staatliches Museum für Tierkunde Dresden), and from the Museum für Naturkunde, Leibniz-Institut, Berlin (formerly known as the Zoologisches Museum Berlin), respectively.

Label data attached to each type specimen are cited in full with a slash [/] indicating a line change and a double slash [//], indicating a label change. Our notes and/or interpretations are included within brackets throughout the text.

The habitus of the two holotypes was photomicrographed with the rear camera of a Samsung Galaxy S8 smartphone, which was attached to the right eyepiece of a Wild M3 stereomicroscope through a magnetic plate of a clothespin-shaped plastic adapter as shown in Figs. 1a-h and as described previously (Vilela and Prieto, 2018; Vilela and Bächli, 2019; Bächli and Vilela, 2020a). Objective lenses of 1.6×, and 4× were used, and the camera was set to default or optically zoomed to

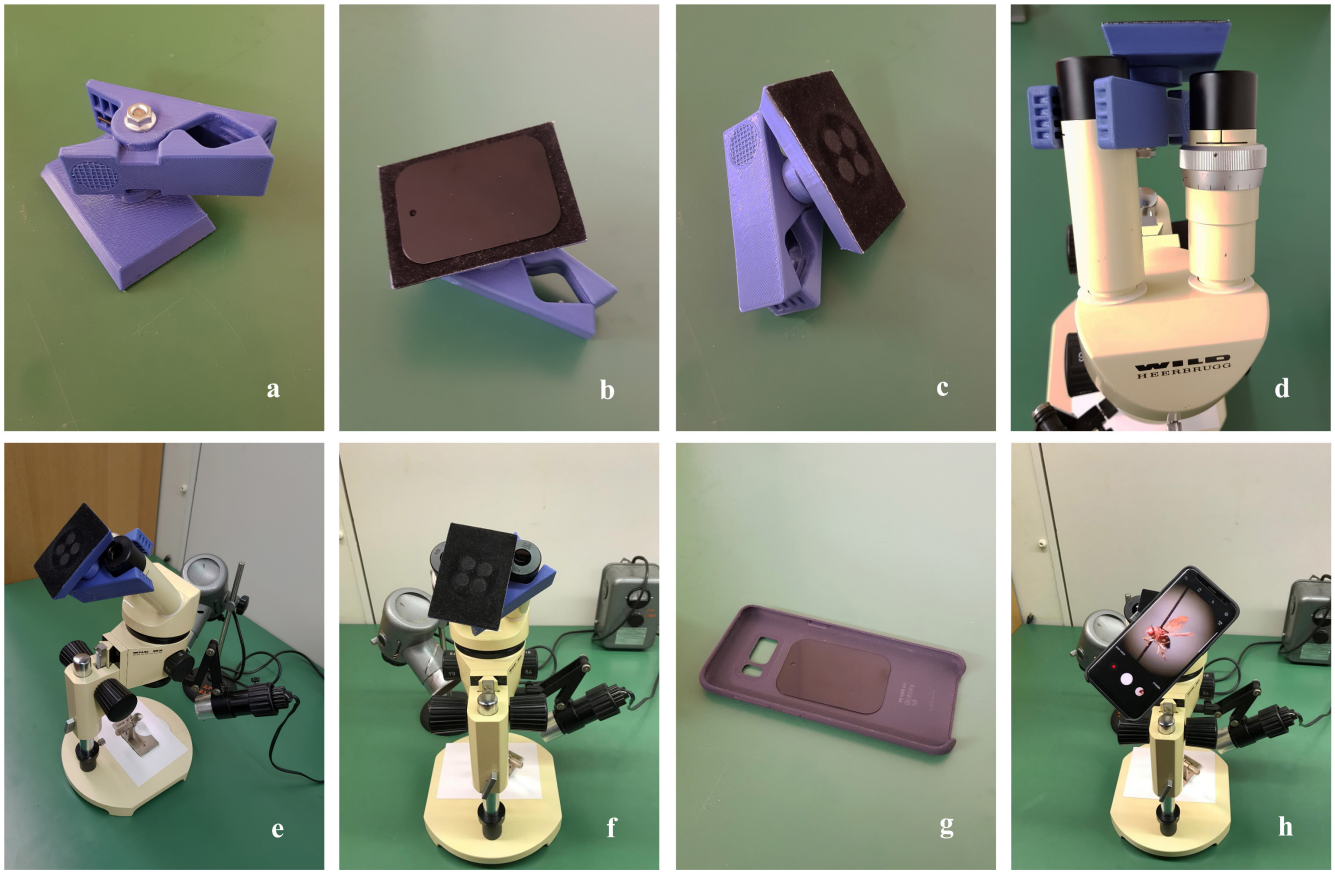

Figure 1 Plastic clothespin-shaped adapter used for connecting the smartphone to the stereomicroscope eyepiece, several views: a) swivel magnetic plate seen from below (blue rectangle), b) a movable metal plate placed over the magnetic plate seen from above, c) swivel magnetic plate (metal plate removed) with four circles in the center of velvet cover, oblique view, d) adapter attached to the stereomicroscope with the magnetic rectangle plate partially placed over the right eyepiece but not touching the left eyepiece, posterior view, e) idem, oblique view, f) idem, anterior view of the uncovered right eyepiece lens to where the rear camera should be positioned, g) a movable metal plate placed inside the smartphone case, h) smartphone obliquely positioned over the right eyepiece as seen by the observer.

2×, 3×, or 4× with the autofocus mode disabled. A series of pictures were taken at consecutively increasing depths of focus for each selected view.

The image series were mostly stacked using the "All Methods" algorithm of the open-source software CombineZP (Hadley, 2010) to create an in focus composite. In the case of the photomicrographs of the terminalia preparations, the "all methods" algorithm did not always provide the best results and is likely due to the transparency of this anatomical structure. Better results were obtained by opening the output folder, which was automatically created by the software, and comparing the quality of the images obtained using a specific stacking method. During this process, one can eliminate individual files with poor quality and only restack the best files from the 6 methods.

Microscope slide preparations were done according to Wheeler and Kambysellis (1966) and Kaneshiro (1969). The abdominal sclerites, including the disarticulated male terminalia, are preserved in glass microvials filled with glycerin and attached to the stopper with the pin holding the respective specimen. Further details can also be found in Vilela and Bächli (2000) and Bächli et al. (2004).

The male terminalia were photomicrographed with the same smartphone attached to a Zeiss compound microscope Using objective lenses of 10×, 16×, 20×, 25×, and 40×.

The composite photomicrograph images taken with either the stereomicroscope or compound microscope were edited with Adobe Photoshop software. Unless otherwise indicated, all of the photomicrographs on the same plate were taken and enlarged to the same magnification.

Figure 2 *Stegana magnifica* Hendel, 1913, labels of the male holotype [improperly labelled as lectotype].

For morphological terminology, measurements and indices see Vilela and Bächli (1990, 2000)-and Bächli et al. (2004).

Results and discussion

Stegana Meigen, 1830

Stegana Meigen, 1830: 79 (description).

Type species: *Stegana nigra* Meigen, 1830: 79 (= *Musca furta* Linnaeus, 1767: 991) (des. Zetterstedt, 1847: 2577).

We refer to the overview of Brake and Bächli (2008) and Bächli (2019) for the subgenera and included species and we also direct the reader to Pirani and Grimaldi (2019).

Diagnosis (modified from Bächli et al., 2004 and Zhang et al., 2012).

Head setae generally thick and long, but postocellar setae thinner and in some species minute or absent. Interfrontals may be numerous and large. Tibia of middle leg basally with a posterodorsal row of 3–5 erect setae, followed downwards by a row of shorter, less erect setae (see Figs. 2A–D in Zhang et al., 2012). Wing (see Figs. 1C–E in Zhang et al., 2012) in most species conspicuously bent down at rest, generally dark brown, particularly along the Costa, but almost transparent in basal 1/4 and in cell m_4, where (outside posterior crossvein) a roundish, fully transparent "window" may appear; vein R_{2+3} usually almost straight, at most slightly curved upwards just before terminating; vein R_{4+5} straight in apical half; vein M softly and more or less equally curved upwards towards vein R_{4+5}; costal section III with about 8 warts on the lower side; costal section IV weak and relatively short, acrocostal index large (ac index about 8–17 in the available descriptions).

Stegana (*Steganina*) Wheeler, 1960

Type species: *Musca coleoptrata* Scopoli, 1763:338.

Stegana (*Steganina*) Wheeler, 1960:110: Wheeler, 1981: 31 (affiliation); Brake and Bächli, 2008: 296 (affiliation).

Stegana (*Steganina*) *magnifica* Hendel, 1913

(Figs. 3-13)

Stegana magnifica Hendel, 1913: 630 (description).

Stegana magnifica Hendel, 1913: Sturtevant, 1921: 133 (affiliation); Malloch, 1924a: 98 (key); Duda, 1927: 23 (affiliation); Wheeler, 1970: 79.6 (affiliation); Val et al., 1981:135 (distribution).

Stegana (*Steganina*) *magnifica* Hendel, 1913: Wheeler, 1960: 110 (affiliation); Wheeler, 1981: 31 (affiliation); Brake & Bächli, 2008: 298 (type material, affiliation).

Type locality. Peru, Cusco/Ucayali Regions, Meshagua [misspelled, Mishagua according to Papavero, 1973: 422], Urubamba river [details of the locality unknown].

Diagnosis. Eye longish, with almost horizontal main axis, red, medially bearing two parallel dark brown horizontal stripes, divided by a narrow paler band (Figs. 7a, c, d). Large body length (ca. 5.5 mm), distance between fore and middle legs unusually long. Wing with particular pattern: anterior margin brown, getting darker towards wing tip, extended backwards over vein R_{4+5}; both crossveins brown, vein M with a narrow brown band along its whole length, a pale (transparent) area in cell r_{4+5} containing two isolated dark spots; pale (transparent) areas are also visible in cells m_3 and m_4. Surstylus roundish, protruded, deeply concave, bearing one peg-shaped prensiseta medioventrally; outer margin square-lobed medially. Dorsal arch anteromedially densely scaled. Handle of ejaculatory apodeme twice as long as aedeagal apodeme. Ventrodistal margin of aedeagus conspicuously ornate with a fringe of five large, irregular, somewhat rectangular-shaped strips (with the median one being the shortest), resembling an upside-down strip curtain.

Figure 3 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], habitus, two views: a) left lateral, b) left oblique dorsal. Scale bar = 1 mm.

Figure 4 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], habitus, two views: a) head and thorax dorsal, b) abdomen, dorsal. Scale bar = 1 mm.

Figure 5 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], habitus, two views: a) head and thorax, dorsal, b) thorax and abdomen, dorsal. Scale bar = 1 mm.

Figure 6 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], habitus, two views: a) anterior (frontal), b) posterior (distal). Scale bar = 1 mm.

Figure 7 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], head close-ups, four views: a) frontal, b) dorsal, c) left lateral, d) left oblique ventral. Scale bar = 0.5 mm.

Material examined.

Holotype male (Fig. 2): "Peru - Meshagua [misspelled, Mishagua or Mishahua river] / 12.10.03 / Urubambafl. [Urubamba river] // Stegana / magnifica H. [Hendel] / det. Hendel // 125 // Staatl. Museum für / Tierkunde Dresden // ♂ / 187 [our own numbering system] // LECTOTYPE [improperly labelled] // *Stegana* (*Steganina*) / *magnifica* Hendel / Vilela & Bächli det." [Senckenberg Collection, Dresden, Germany].

Description.

♂ (Figs. 3-13).

Body length about 5.5 mm.

Head (Figs. 5a, 7a-d) much broader than high, generally brownish-yellow, fully white in lower third, with strong, black setae. Frons (Fig. 7b) brownish-yellow, with a dark brown band on the anterior fifth. Frontal length about 0.78 mm; frontal index about 1.05, top to bottom ratio about 1.18. Frontal triangle short, slightly paler, about 50% of the frontal length; ocellar triangle dark brown, slightly prominent, about 30% of the frontal length. Orbital plates paler along the eye margin, about 65% of the frontal length. Orbital setae in a row, distance of or 3 to or 1 about 190% of or 3 to vtm, or1 / or3 ratio about 0.86, or2 / or1 ratio about 0.96, vt index about 1.00, postocellar setae long, crossed, index = 39%, ocellar setae long, about 65% of the frontal length; vibrissal index about 0.32. Face brownish in the upper half, white below, with a short, prominent carina. Cheek (Figs. 7a, c, d) broad,

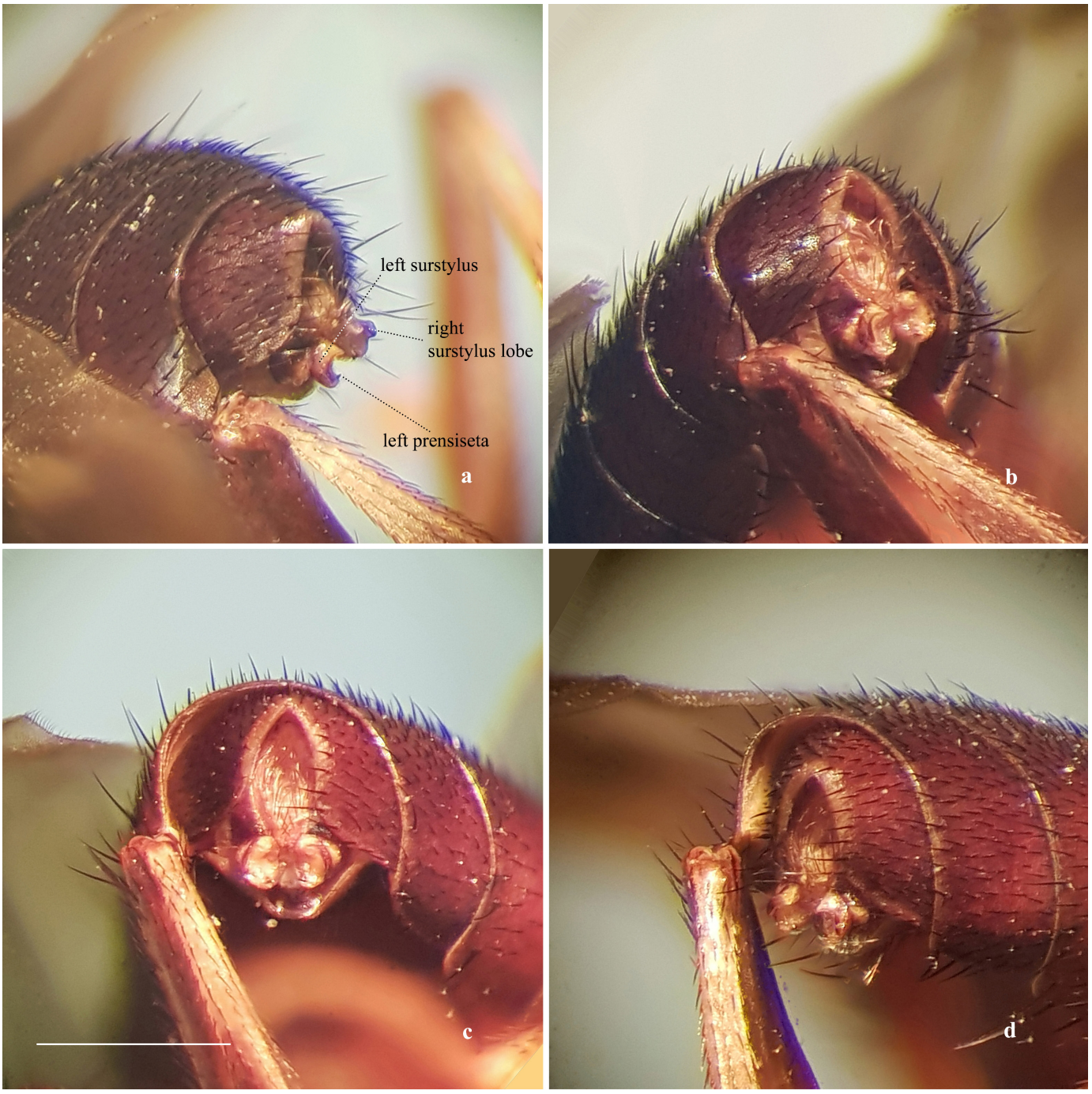

Figure 8 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], terminalia close-ups, four views: a) left oblique posterior, b) oblique posterior, c) posterior, d) right oblique posterior. Scale bar = 0.5 mm.

white, index about 4.50. Eye longish, main axis nearly horizontal, red, medially bearing two parallel dark brown horizontal stripes which are divided by a narrow paler band (Figs. 7a, c, d), index about 1.34. Occiput brownish-yellow in the upper half, white below, with a dark brown band in between. Pedicel yellow. Flagellomere 1 longish, yellow, becoming brown towards the tip. Arista (Figs. 7c, d) with 11 long dorsal, 7 long ventral and about 12 distinct inner branches, plus a terminal fork. Proboscis, clypeus and palpus yellow.

Thorax (Fig. 3) generally yellowish, prolonged: the distance between fore and middle legs is unusually long. Length about 3.20 mm. Scutum yellowish (Fig. 3b), with 6 brown longitudinal stripes: the inner pair do not reach the anterior border, becoming broader towards the scutellum, a shorter pair laterally behind the suture, and a pair above the postpronotum alongside the margin of mesonotum, 16 rows of acrostichal setae. h index about 0.66, dc index about 0.47. Prescutellars strong, on each side with two short setae between prescutellars and posterior dorsocentrals. Scutellum (Figs. 3b, 5b) slightly pointed, brownish with a narrow, central whitish-yellow stripe which becomes broader towards the tip, the distance between apical scutellars is about 70% of that of the apical to basal distance;

Figure 9 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], sternites 5 and 6, ventral view. Scale bar = 0.2 mm.

basal ones divergent; scut index about 1.44. Pleura (Figs. 3a, 4a) yellowish, with two dark brown longitudinal stripes, katepisternum brown below the lower stripe. Sterno index about 0.93. Halter yellow. Legs generally brownish, fe2 yellow on basal ¼, ti1 and ti2 apically paler yellowish, ti3 yellowish on basal half. Short preapical setae on all tibiae, short ventral apical setae on the middle tibia. Middle tibia with a distinct row of posterodorsal erect setae, becoming shorter downwards. Middle tarsal joints slightly broadened.

Wing (Figs. 5b, 6) with a particular brown pattern not seen in other *Stegana* species: anterior margin brown, getting darker towards the tip of the wing, extended backwards over vein R_{4+5}; both crossveins brown, crossvein m-cu somewhat sigmoid, vein M with a narrow brown band along its whole length, a pale (transparent) area in cell r_{4+5} containing two isolated dark spots; pale (transparent) areas are also visible in cells m_3 and m_4; length about 4.20 mm. Indices: C about 2.44, ac about 15, hb about 0.59, 4C about 0.94, 4v about 1.39, 5x about 0.56, M about 0.58, prox. X about 1.00.

Abdomen (Fig. 6b) dark brown, without a pattern but paler basally. Sternites 5 and 6 (Fig. 9) wider than long, somewhat round-cornered rectangles, posterior margin straight and shallowly concave, respectively.

Terminalia (Figs. 8, 10-13)

Epandrium (Figs. 10, 11a) microtrichose, except for a narrow anterior stripe and a ventral area adjacent to the surstylus, slightly

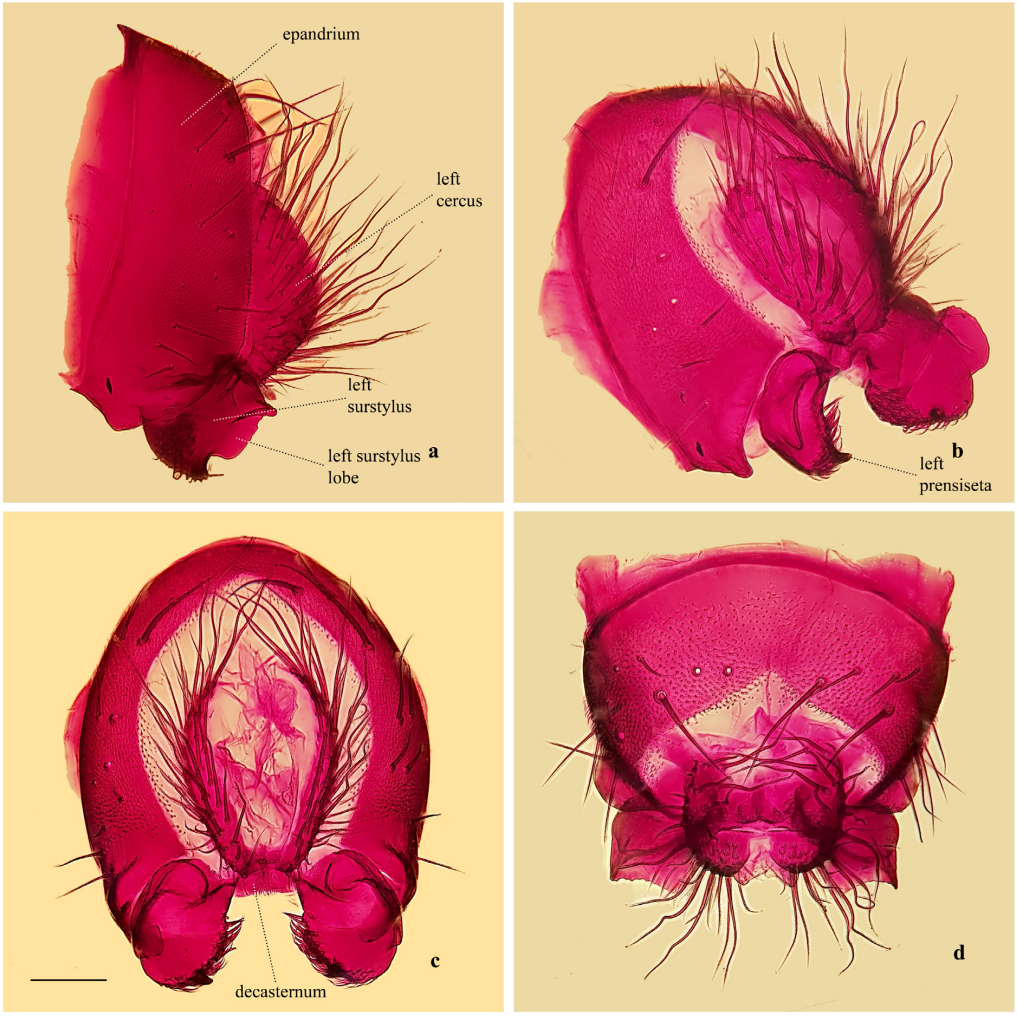

Figure 10 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], external terminalia (epandrium and associated sclerites), four views: a) left lateral, b) left oblique posterior, c) posterior, d) dorsal. Scale bar = 0.1 mm.

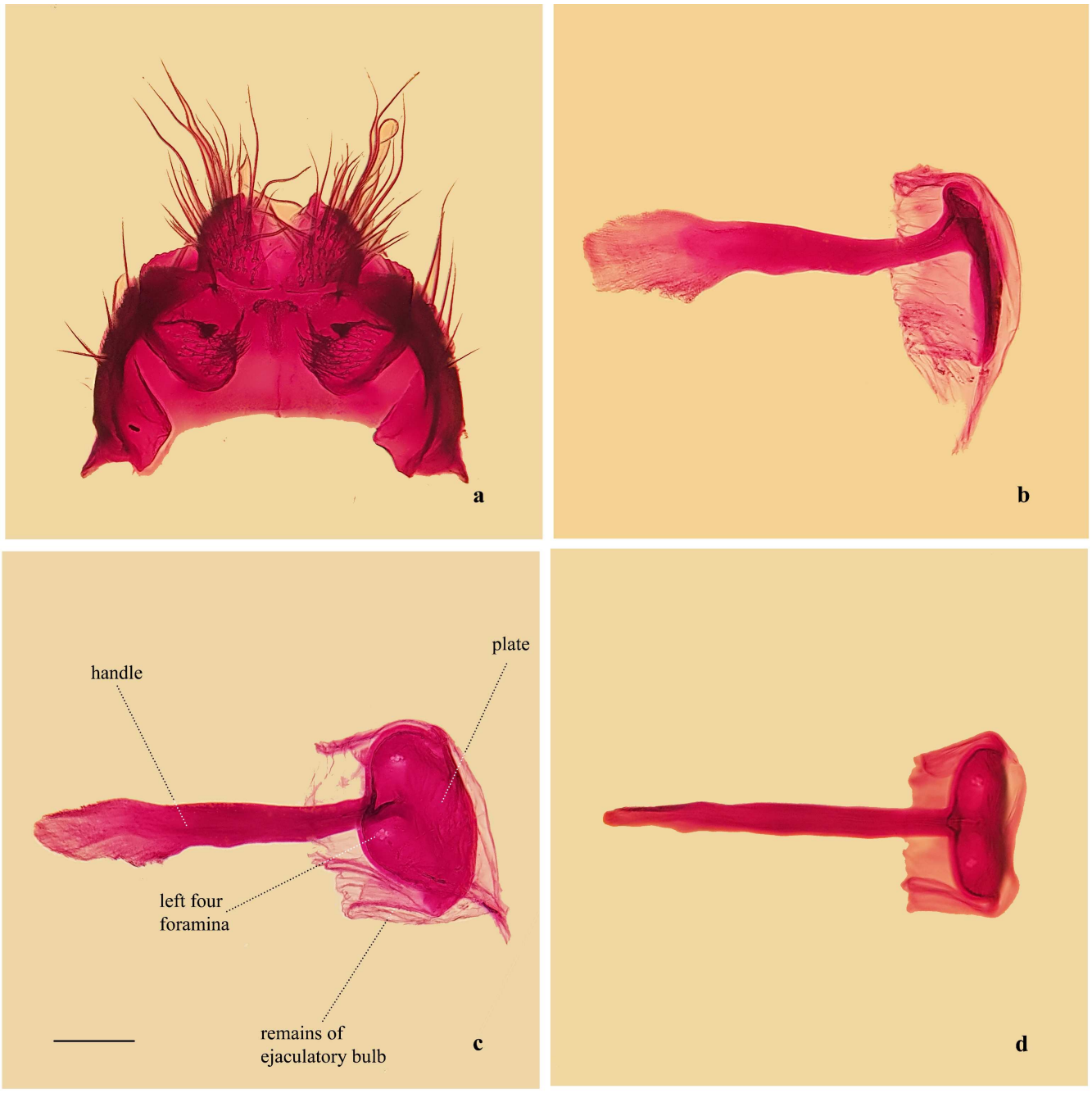

Figure 11 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], external (one view, a) and internal terminalia (ejaculatory apodeme, three views, b-d): a) epandrium and associated sclerites, ventral, b) left lateral, c) oblique dorsal, d) dorsal. Scale bar = 0.1 mm.

setose, bearing two parallel rows of setae, one adjacent to the distal margin, mostly bearing larger setae, and one medially, bearing smaller setae; ventral lobe tiny, slightly rugose, finger-shaped, anteriorly positioned. Cercus (Figs. 10, 11a) lower positioned, narrow, densely setose, slightly and dispersedly microtrichose, anteriorly articulated to the lower posterior margin of the epandrium; ventral lobe absent. Surstylus (Figs. 8, 10, 11a) protruded, somewhat roundish, deeply concave, double-walled, outer margin curved, square-lobed medially (Figs. 8a, 10b), slightly serrate dorsally (Fig. 10d), medioventrally bearing a single, peg-shaped prensiseta (Figs. 8a, 10b, 11a), adjacent to a brush-shaped patch of short, curved, sharply pointed setae on the inner ventral surface (Fig. 11a), not microtrichose, not fused to the epandrium. Decasternum relatively small, sclerotized, trapezium-shaped, medially bearing a T-shaped keel. Hypandrium long and wide (Figs. 12, 13) fused to the gonopods (Figs. 12a, 13b). Dorsal arch mostly covered mediodorsally with tiny scales (Figs. 12c, 13b), anteriorly denser, anterior margin strongly biconcave laterally in the dorsal view; posterior margin embracing the aedeagus medially (Figs. 12, 13a). Aedeagus sclerotized, ca. twice as short as the aedeagal apodeme (Fig. 12c), fused to each other; mediodistal margin irregularly sinuate; ventrodistal margin conspicuously ornate with a fringe of five large, irregular, somewhat rectangular-shaped strips (with the median one being the shortest), resembling an upside-down striped curtain (Figs. 12b, d). Aedeagal apodeme twice as long as the aedeagus

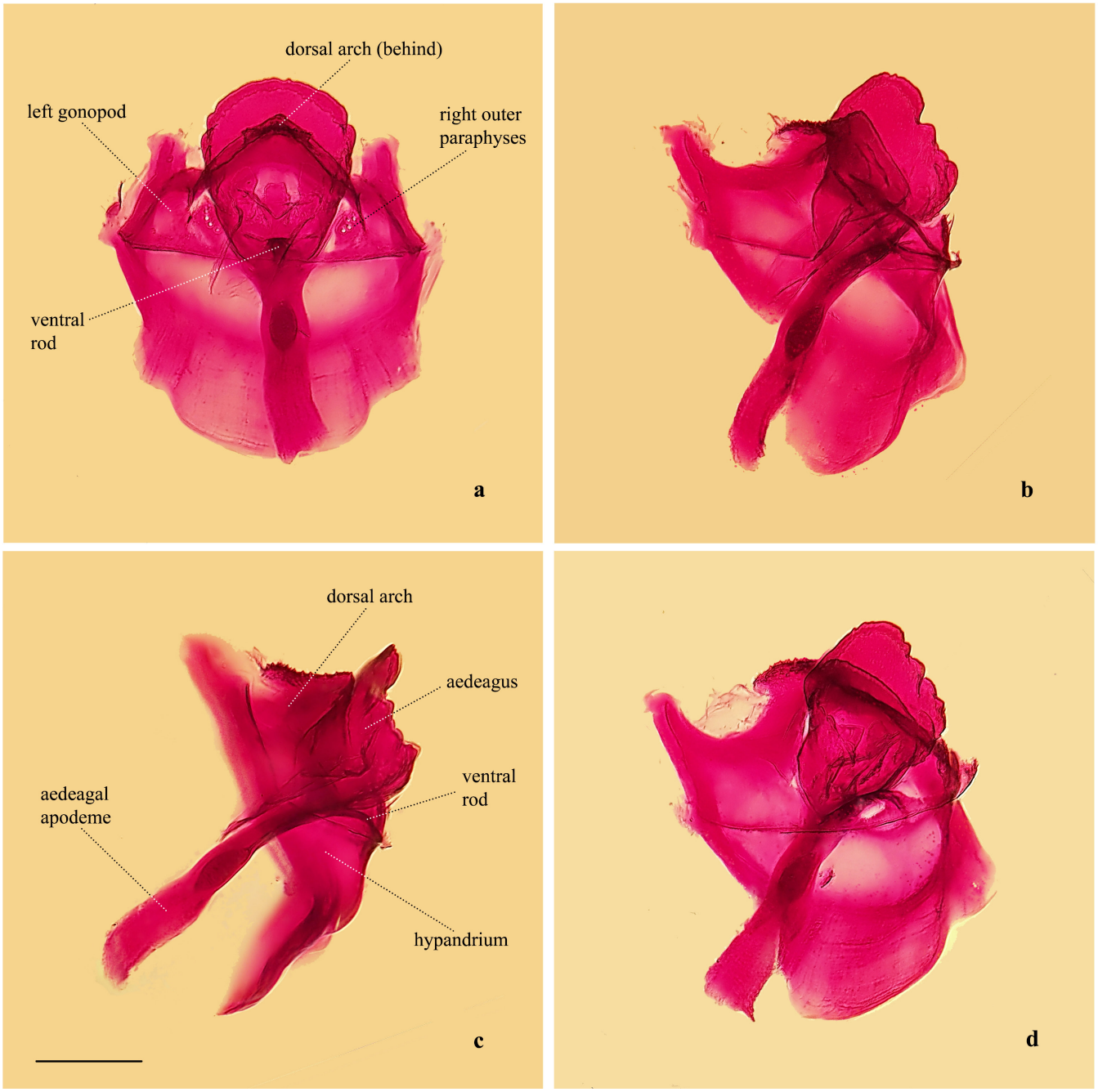

Figure 12 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], hypandrium and associated sclerites, four views: a) posterior, b) oblique posterior, c) left lateral, d) oblique anterior. Scale bar = 0.1 mm.

(Fig. 12c). Ventral rod strongly sclerotized (Fig. 13a). Outer paraphysis (Figs. 12a, 13b) proximally membranous, relatively small, distally widely separated apart, perpendicular to the aedeagus, articulated to the gonopod by membranous tissue, bearing 5 setulae near the inner margin, arranged in a curved row. Inner paraphysis absent (probably fused to the aedeagus). Ejaculatory apodeme (Figs. 11b-d) large, heavily sclerotized; handle twice as long as the aedeagal apodeme, perpendicular to and arising from the anterodorsal edge of the basal plate, laterally flattened, anteriorly expanded in profile; plate longer than the aedeagus, pentagon-shaped in the posterior view, slightly bent dorsoventrally, laterally bearing two groups of four apparently membranous foramina near the anterodorsal edge (Fig. 11c).

Distribution.

Peru, Meshagua [misspelled, Mishagua (or Mishahua) river], Urubamba river (known from type locality only).

Comments.

Hendel (1913, p. 631) wrote “1 female”. The specimen we have analyzed, however, is a male, an observation that Hendel could have overlooked. To our knowledge, no other specimens are extant. It should also be stressed that the general characters of *S. magnifica* are very different from those of the other species included in the subgenus *Steganina*, where it has been considered. Notably, this species exhibits an almost horizontal main axis of the eyes and should be, in our opinion, placed in a different subgenus.

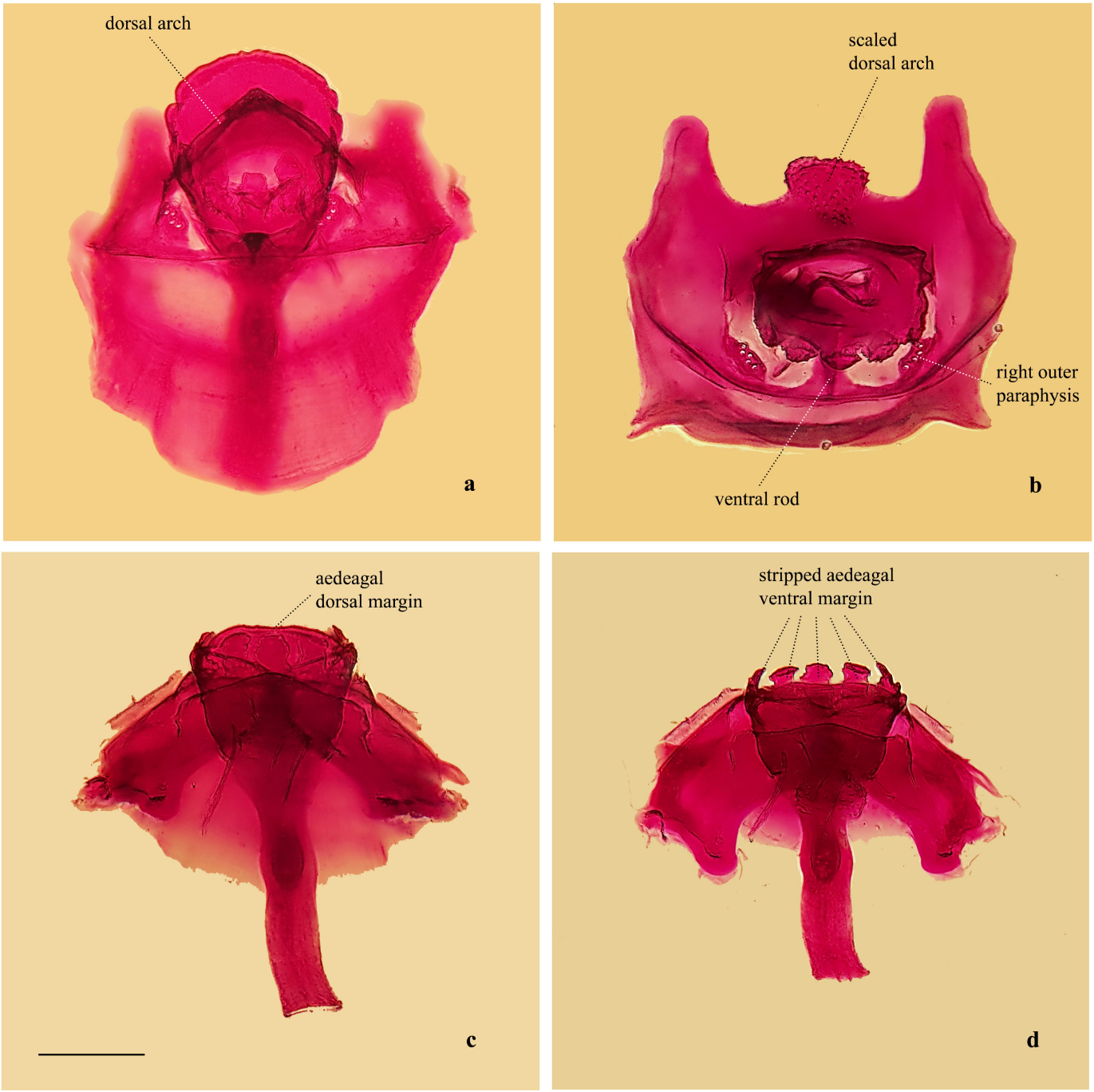

Figure 13 *Stegana magnifica* Hendel, 1913, male holotype # 187, Urubamba river, Mishahua, Cusco/Ucayali Region, Peru [SMT], hypandrium and associated sclerites, four views: a) anterior, b) oblique posterior, c) posterodorsal, d) dorsal. Scale bar = 0.1 mm.

Stegana (*Ceratostylus*) Enderlein, 1922

Type species: *Ceratostylus fumipennis* Enderlein, 1922:297 (original designation).

Ceratostylus Enderlein, 1922: 296

Stegana (*Ceratostylus*) (Enderlein, 1922): Wheeler, 1981: 30 (affiliation, as a monotypic subgenus of *Stegana*); Brake and Bächli, 2008: 293 (affiliation).

Comments.

The genus name *Ceratostylus* refers to the abnormal, comma-shaped flagellomere 1 of the antenna. Having checked the type specimen with the left flagellomere 1 largely missing, we were unable to conclusively determine whether this is the result of a developmental malformation or an artifact of shrinking. However, based on our knowledge, no other *Stegana* species exhibit a comparable shrinking effect.

Stegana (*Ceratostylus*) *fumipennis* (Enderlein, 1922)

(Figs. 14-19)

Ceratostylus fumipennis Enderlein, 1922: 296 (description, type species).

Stegana (*Ceratostylus*) *fumipennis* (Enderlein, 1922): Wheeler, 1981: 30 (affiliation); Bächli, 1984: 240 (type material); Brake and Bächli, 2008: 293 (type material, affiliation).

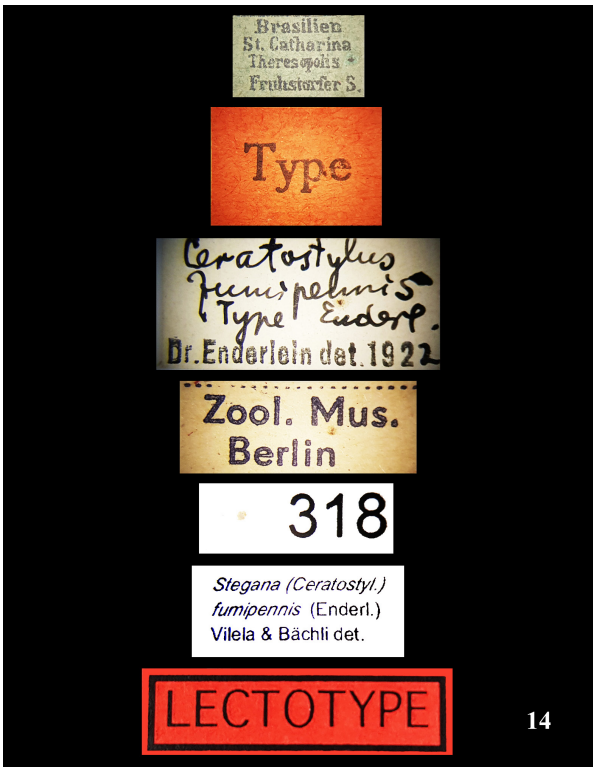

Figure 14 *Stegana fumipennis* (Enderlein, 1922), labels of female holotype [improperly labelled as lectotype].

Type locality: "Süd – Brasilien [Southern Brazil], Santa Catharina [state], Theresopolis".

Diagnosis.

Antennal flagellomere 1 conspicuously comma-shaped, proximally wide and yellow, distally abruptly narrowed, dark brown and slightly bent upwards. Other characters clearly not distinguishable from most *Stegana* species.

Material examined.

Holotype female (Fig. 14): "Brasilien [Brazil] / St. Catharina [Santa Catarina state] / Theresopolis [now Teresópolis, about 27°45'S, 48°57'W] / Fruhstorfer S. [collector, should read H.] // Type // Ceratostylus / fumipennis / Type Enderl. / Dr. Enderlein det. 1922 // Zool. Mus. Berlin // 318 [our own numbering system] // LECTOTYPE [improperly labelled] // *Stegana* (*Ceratostyl.*) / *fumipennis* (Enderl.) / Vilela & Bächli det." [Museum für Naturkunde – Leibniz-Institut, Berlin, Germany].

Description.

♀.

Body length about 2.3 mm.

Head (Figs. 16, 17a) generally dark brown, with a pale yellow lower half. Frons dark brown in the upper two thirds, yellow below, setae pale. Frontal length about 0.41 mm; frontal index about 1.71; top to bottom width ratio about 1.14. Frontal triangle not very distinct, about 60% of the frontal length; ocellar triangle slightly prolonged, blackish, about 35% of the frontal length. Orbital plates narrow, close to eye margin, 60% of the frontal length. Orbital setae almost in a row, a distance of or3 to or1 about 220% of or3 to vtm, orbital setae damaged, postocellar setae about 20% of the frontal length;

Figure 15 *Stegana fumipennis* (Enderlein, 1922), female holotype # 318, district of Teresópolis, municipality of Águas Mornas, Tabuleiro microregion, Grande Florianópolis mesoregion, state of Santa Catarina, Brazil [ZMB], habitus, four views: a) left lateral, b) left oblique dorsal, c) head and thorax dorsal, d) abdomen, dorsal. Scale bar = 1 mm.

Figure 16 *Stegana fumipennis* (Enderlein, 1922), female holotype # 318, district of Teresópolis, municipality of Águas Mornas, Tabuleiro microregion, Grande Florianópolis mesoregion, state of Santa Catarina, Brazil [ZMB], head close-ups, four left views: a) lateral, b) oblique dorsal, c) oblique frontal, d) oblique ventral. Scale bar = 0.5 mm.

ocellar setae about 55% of the frontal length; vibrissal index about 0.42. Face pale yellow. Carina short, dorsally sharp. Cheek narrow, whitish, index about 11.5. Eye main axis 30 degrees' oblique, index about 1.21. Pedicel yellow. Flagellomere 1 (Figs. 16, 17a) yellow, longer than the face, basally somewhat swollen then abruptly narrowing, apical fifth distinctly bent upwards, with a black tip (left flagellomere 1 partially missing); outer edge somewhat serrate (Fig. 16c). Arista partially broken, branches appear long. Clypeus, proboscis and palpus yellow.

Thorax (Figs. 15a, b) length 1.20 mm. Scutum dark brownish, acrostichal setae damaged, all dorsocentrals broken, prescutellars strong, on each side with two short setae between prescutellars and posterior dorsocentrals; dc index about 0.22. Scutellum brownish, apically slightly pointed, the distance between apical scutellars about 70% of that of the apical to the basal one; scutellars damaged. Pleura (Figs. 15a, 16d, 17a) with a broad, blackish longitudinal stripe in the upper third, whitish below. Halter pale brownish. Legs (Fig. 17b) generally pale yellowish, middle femur brown in the apical two thirds, middle tibia brown in the basal third, middle tarsal joints 1–4 distinctly broadened, ventrally ornamented with two parallel rows of short spines (Fig. 17c), short preapical setae on all of the tibiae, no ventral apical setae visible.

Figure 17 *Stegana fumipennis* (Enderlein, 1922), female holotype # 318, district of Teresópolis, municipality of Águas Mornas, Tabuleiro microregion, Grande Florianópolis mesoregion, state of Santa Catarina, Brazil [ZMB], head, terminalia and mid-leg tip close-ups, left wing: a) head right lateral oblique, b) external terminalia oblique ventral, c) left mid-leg tarsomeres ventral, d) left wing dorsal. Images in a-c and d were produced at different magnifications. Scales bars = 0.5 mm (a-c), = 1 mm (d).

Wing (Fig. 17d) brownish but becoming transparent towards wing base as well as towards hind margin, vein R_{2+3} sigmoid and apically slightly bent to the costa, section IV of vein M almost straight and distinctly bent towards vein R_{4+5}, length about 2.05 mm, length to width ratio about 1.84. Indices: C about 2.40, ac about 9, hb about 0.56, 4C about 1.20, 4v about 1.67, 5x about 1.00, M about 0.40, prox. X about 0.93.

Abdomen (Figs. 15d, 17b) dark brown without markings; sternites ca. 2.5× wider than long (Fig. 18f).

Terminalia (Figs. 18a-e, 19). Epiproct relatively small, pentagon-shaped, dorsoventrally flattened, distally emarginated, submedially bearing two setae, not microtrichose, followed by a pair of finger-shaped, distally double-walled, setose, sparsely microtrichose cerci. Hypoproct relatively large, laterally bent upwards, surrounding the cerci laterally, proximally bare, distally setose, sparsely microtrichose. Sternite 8 (egg guide) devoid of oviscapt valves, distal margin somewhat medially trilobed and setose at the middle distal end, not microtrichose, laterally bearing a single row of setae, slight dorsal bend. Inner spermathecal capsule bulbous (Fig. 19), weakly sclerotized, sparsely warty, devoid of proximal and distal introverts, distally bearing a tail-shaped appendage (accidentally destroyed during dissection procedures; one lost).

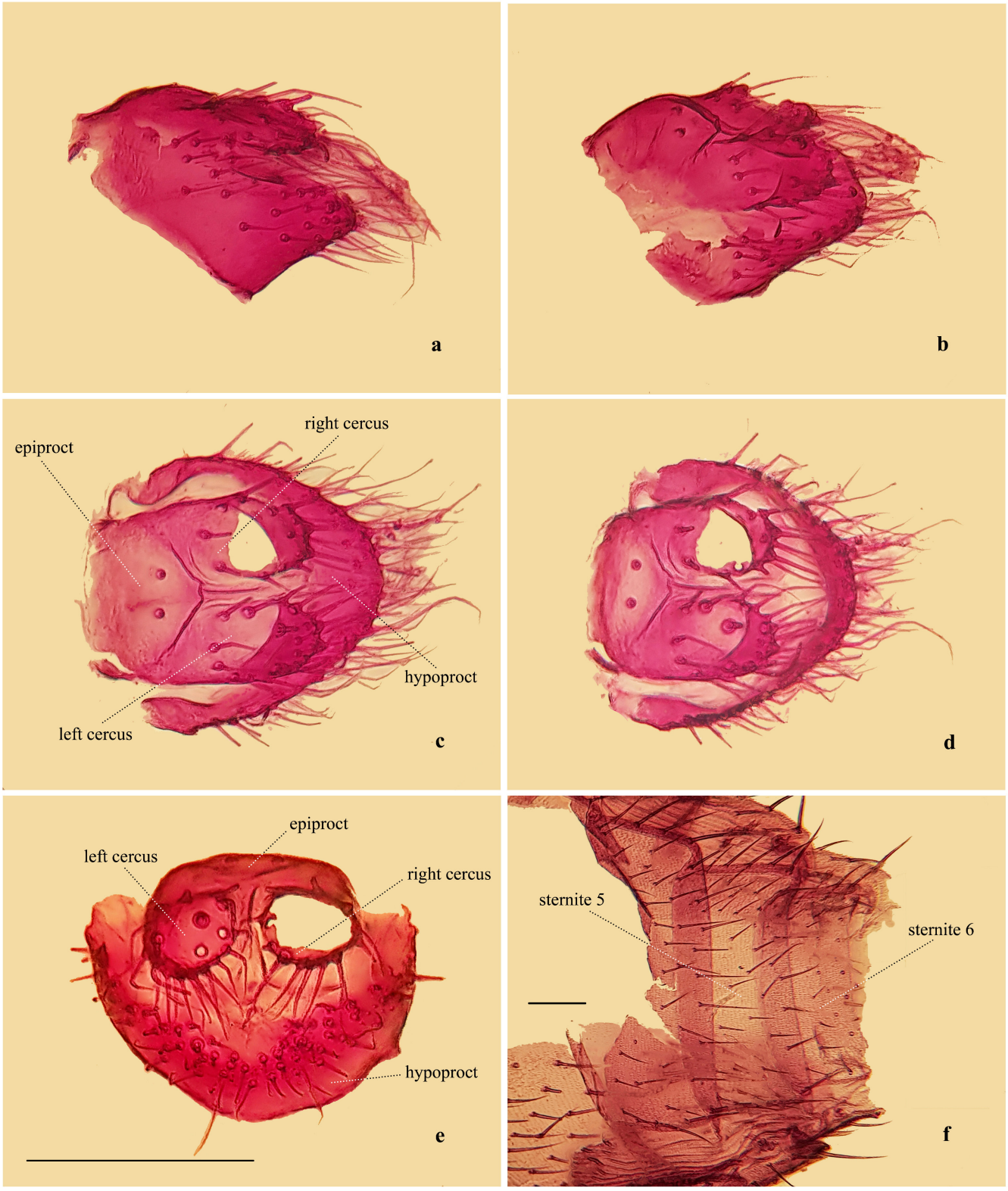

Figure 18 *Stegana fumipennis* (Enderlein, 1922), female holotype # 318, district of Teresópolis, municipality of Águas Mornas, Tabuleiro microregion, Grande Florianópolis mesoregion, state of Santa Catarina, Brazil [ZMB], analia (epiproct, cerci and hypoproct, a-e), five views, and distal abdomen (f), one view: a) left lateral, b) oblique dorsal, c) dorsal, d) oblique posterior, e) posterior, f) ventral. Images in a-e and f were produced at different magnifications. Scale bars = 0.1 mm.

Distribution.

Brazil. Santa Catarina: Águas Mornas municipality, rural district of Teresópolis (known from the type locality only).

Comments.

This species shows all of the generally accepted characteristics of *Stegana* species. At present, based mainly on the conspicuous shape of flagellomere 1 of the antenna, we have not decided whether placement of this specimen in a separate subgenus is justified.

Figure 19 *Stegana fumipennis* (Enderlein, 1922), female holotype # 318, district of Teresópolis, municipality of Águas Mornas, Tabuleiro microregion, Grande Florianópolis mesoregion, state of Santa Catarina, Brazil [ZMB], internal terminalia (sternites 7 and 8), uterus, inner spermathecal capsule, two views: a) ventral, b) left lateral. Scale bar = 0.1 mm.

Acknowledgments

We would like to thank Michael Pohl, Museum für Naturkunde, Berlin, Germany, and Uwe Kallweit, former Staatliches Museum für Tierkunde, Dresden, Germany for loaning these type specimens. We are also indebted to Prof. Lukas Keller, University of Zürich-Irchel, Switzerland, for providing laboratory facilities and Robert Ryan Geyer for English editing. We also thank the suggestions and corrections provided by two reviewers (Wayne N. Mathis and one anonymous) that improved the manuscript.

Funding

This research did not receive any financial support from funding agencies in the public commercial, nor not-for-profit sectors.

Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

GB, CRV conceived and designed the study; GB provided facilities, requested the specimens, and made the external morphology descriptions; CRV dissected the flies, prepared the microscope slides, took the photomicrographs, stacked the images and made the internal morphology descriptions. Both authors wrote the manuscript and approved the final version.

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